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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,722	08/25/2003	Kimoon Kim	402762	9833

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LEYDIG VOIT & MAYER, LTD  
700 THIRTEENTH ST. NW  
SUITE 300  
WASHINGTON, DC 20005-3960

EXAMINER
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DRODGE, JOSEPH W

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/646,722

Applicant(s)

KIM ET AL.

Examiner

Joseph W. Drodge

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2006.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 25 and 26 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 25 and 26 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☒ Certified copies of the priority documents have been received in Application No. 09/605,635.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0803.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

The disclosure is objected to because of the following informalities: The Specification does not identify the issued patent number of the parent application ("now Patent 6,639,069").

Appropriate correction is required.

Applicant's election with traverse of Group I in the reply filed on 1/13/2006 is acknowledged. The traversal is on the ground(s) that there is not a serious burden on the Examiner to search all Groups, since all inventions concern the same Cucurbituril chemical. This is not found persuasive because the Groups concerned various, numerous and unrelated technologies, that each largely include independent, unrelated and distinct fields of search in different classes of the Patent Office; for instance the elected Group concerning water treatment is unrelated to Non-elected Groups concerning diverse fields such as "cosmetics", "scented papers", "drug carriers", etc .

The requirement is still deemed proper and is therefore made FINAL.

Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The first portion of claim 25 is confusing in that it continues to recite numerous unrelated possible uses of the cucurbituril derivatives, including all of the non-elected method of using options, these should have been deleted in response to the Restriction Requirement, and now require deletion.

Also in claim 25, in part b1), it is unclear what constitutes the "reaction product" which lacks antecedent basis (is reaction product a reaction between two or more of the ingredients of part a1) of the claim?).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Publication by Cintas in view of Starkey et al patent 5,814,233; German patent DE 19603377, Nickerson patent 2,725,308, Mathew patent 3,767,669 and Japanese patent JP 11217557.

Cintas discloses a method of using cucurbituril compounds for removing organic dyes from waste water (bottom of page 215) and heavy metal from water (page 216), using either cucurbit6uril (page 206) or cucurbit5uril (page 219), the compounds being formed by reacting a compound of the instantly recited glycoluril formula (A), acid with an excess of aldehyde (formaldehyde) and acid (dissolving solution) and heating (top of pages 206 and 215 and description bridging pages 205-206 to form the cucurbituril compounds.

Firstly, it is unclear from the Cintas disclosure whether the cucurbituril compounds are "derivatives". However, Starkey et al teach that glycoluril compositions (which would encompass cucurbiturils) and their derivatives are interchangeable (column 4, lines 22-26) for use in separating either heavy metals (or other substances) from water (column 2, lines 61-65 and column 4, lines 22-26). Hence, it would have been obvious to one of ordinary skill in the art at the time of the invention to have synthesized cucurbituril derivatives with the Cintas disclosed process, as suggested by Starkey et al, since derivatives of glycoluril compounds are equivalent in use to the original functional compositions.

Secondly, the instant claims differ in requiring a molar ratio of 3-7:1 acid to compound A and of 2-20:1 aldehyde to the compound A/acid mixture in the reaction to

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prepare the derivative. However, Cintas discloses that an "excess of formaldehyde" is used (pg. 205) and an abundance of acid employed at one or more of plural process stages (paragraph bridging pages 205-206 and 1<sup>st</sup> full paragraph of page 206), '377 similarly teaching a solution of strong mineral acid and excess formaldehyde (1<sup>st</sup> page of the Abstract), while Nickerson teaches reacting acetylene diureine (i.e. glycoluril) with formaldehyde in a molar ratio of about 4:1 formaldehyde to glycoluril (column 5, lines 1-20) and with a large acid to glycoluril ratio (column 11, lines 29-42) to form glycoluril products.

Hence, it would have been obvious to have utilized the instantly claimed molar ratios in the process of Cintas, as suggested by Cintas, Nickerson and '377, so as to optimize the stoichiometry of the chemical reaction of the glycoluril reactant, without wasting ingredients.

The claims thirdly differ in requiring heating to a temperature of between 70 and 95 degrees C and then further heating to between 95 and 105 degrees C. However, Cintas broadly teaches heating the reactants, while '377 teaches to heat at temperatures of up to 100 degrees C in a first stage and then to further heat up to 150 degrees C in a later stage, and the Japanese '577 reference teaches also heating at between 50 and 120 degrees C (column 2, line 41) followed by heating to temperatures of up to 130 degrees C at a later reaction stage (column 5, lines 9-14). It would have been additionally obvious to have employed the combined teachings of Cintas, '377 and '577 to heat the reactants at the instantly recited temperatures, to optimize the reaction rates and yields of the product.

The claims lastly differ in requiring that the reactants are stirred while reacting to form the product. Mathew teaches stirring, while heating, to form glycoluril products (see for example Example 1 of Mathew). It would have been further obvious to have employed stirring in the reaction to form the Cintas water treatment product, as taught by Mathew, so as to accelerate the reaction time, with benefits including requiring less of catalyst addition, etc.

With regard to claim 26, some amount of plural homologues or analogues of the cucurbituril derivatives produced in the Cintas process would have inherently formed with the varying reactant temperatures employed that are taught by the applied teaching references, Cintas notably disclosing formation of both the "5" and "6" homologues of cucurbituril.

Applicants are also advised that the Declarations and Affidavits submitted in the parent and grandparent patent applications were reviewed, however they would require re-submission during the prosecution of the instant application to be given full consideration in the determination of patentability of the instant claims.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Day et al patent 6,793,839, although not constituting prior art as having an earlier effective filing date, is made of record as disclosing and claiming preparation and uses of mixtures of homologues of cucurbituril compounds, and methods of controlling the obtained ratios of such homologues.

Germany patent 4,001,139 is made of record for recitation of manufacture of glycoluril derivatives for removing dyestuffs and heavy metal salts from waste water.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Drodge at telephone number 571-272-1140. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached at 571-272-1151. The fax phone number for the examining group where this application is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JWD

March 2, 2006

  
JOSEPH DRODGE  
PRIMARY EXAMINER